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**HOW THE PUBLISH-OR-PERISH PRINCIPLE DIVIDES  
A SCIENCE: THE CASE OF ACADEMIC ECONOMISTS**

By

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# How the Publish-or-Perish Principle Divides a Science:

## The Case of Academic Economists

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### Abstract

The publish-or-perish principle has become a fact of academic life in gaining a position or being promoted. Evidence is mounting that benefits of this pressure is being countered by the downsides, notably by means of scientific misconduct or forms of goal displacement by scientists. In this paper we evaluate whether perceived work pressure (publishing, acquisition funds, teaching, administration) is associated with different attitudes towards science and the workplace among economists working at Dutch universities. Based on latent class analysis one can detect a clear divide among economists. Approximately two thirds of the economists perceives that this pressure has more downsides than upsides and one third only perceives only upsides and no downsides. Work pressure does not seem to drive this divide as both classes do not differ in terms of work pressure. Whether one is an optimist or a skeptic of the publish-or-perish principle is more tied to one's position in the hierarchy. Full professors see far more than other faculty members the positive sides of the publish-or-perish principle.

Keywords: science; incentives; publication pressure; science metrics; universities; economists

\* Comments by Kène Henkens and Joop Schippers are gratefully acknowledged.

## 1. Introduction

*“...when you can measure what you are speaking about and express it in numbers you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind”* (Kelvin as cited in Merton, Sills, and Stigler (1984)).

Kelvin’s dictum has been the guiding principle for many generations of scientists, not in the least for economists.<sup>1</sup> Measurement is science. It is somewhat of an irony that this dictum has been inverted and trickled down in the everyday practice of many scholars in valuing their contribution (Moosa, 2018): a scientific contribution only counts as ‘science’ if and only if its impact can be expressed in numbers. And to paraphrase Kelvin: if you cannot express the impact in numbers, your contribution is of an unsatisfactory kind. Deans, department heads, science foundations, grant reviewers, they all rely tacitly or explicitly on the science metrics as the number of publications has become excessively large and the different fields within economics too specialized to appraise. This so-called metric tide in science, as described and weighted by Wilsdon (2016), has progressed and especially in economics the love for measuring ‘productivity’ and ‘ranking’ is noted to be higher than in other disciplines (Fourcade, Ollion, & Algan, 2015). However, the metric tide seems to have reached its limits. E.g., Heckman and Moktan (2020) argue that the excessive focus on top journals in economics has become dysfunctional. And others also note how engaging in ranking games or the grabbing of attention (Klamer & van Dalen, 2002) can potentially harm the way universities practice science, disregarding promising methods and topics (Akerlof, 2020), a neglect of key tasks such as teaching or academic citizenship (Miller, Taylor, & Bedeian, 2011; Osterloh & Frey, 2015), and a disregard for one’s own ideas and publishing what the ‘market’ demands (Frey, 2003). Part of this trend towards goal displacement can also be traced to the allocation of research funds. If one wants to earn a livelihood as a researcher it is either ‘funding or famine’ (Stephan, 2012) and this drive for funds is generally felt to be strongly connected to a publication record: reviewers are often asked to assess the scientific merits of a researcher based on his or her publication record.

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<sup>1</sup> It is even placed in abbreviated form above the entrance of the Social Science building of the University of Chicago (see more (Merton et al., 1984).

The central research question in this paper is how the publish-or-perish pressure affects attitudes and perceptions that academic economists have about their practice of science. A two-step approach is used to tackle this question. First a descriptive question is posed: is the publication pressure real and is this pressure dominating other tasks (teaching, acquiring funds, administration) of scientists? Second, how do economists perceive the pros and cons of publish-or-perish principle, are they skeptical or optimistic about the intended and unintended consequences of applying this principle (Van Dalen & Henkens, 2012a)? And, more in particular, is skepticism or optimism of scholars affected by the work pressure they encounter or are their perceptions mainly tied to (dis)satisfaction with how publication pressure affects their work environment and the way science as an institution functions?

To shed light on how the publication pressure permeates academic life, we will use an extensive survey held in 2015-2016 among economists affiliated with Dutch universities. To put the position of Dutch economics faculties in context, these universities achieved a top position within the economics hierarchy in Europe (Kalaitzidakis, Mamuneas, & Stengos, 2003; Lubrano, Bauwens, Kirman, & Protopopescu, 2003) and the case of the Dutch could function as an appropriate case study for other countries as well because most universities outside the Ivy League have similar ambitions in moving up the various rankings. Furthermore, one should take note of the fact that economics at Dutch universities is rapidly internationalizing and is certainly no longer a Dutch affair: 43 percent of the Dutch economics faculty consists of foreign born members (Rathenau Institute, 2018), most classes at economics departments are taught in English, and like most US faculties international job markets at European and American venues are actively used to attract foreign talent.

The setup of this paper is as follows. First, we will offer a brief overview of pros and cons of the publish-or-perish principle and how it can possibly affect academic work and science in general (section 2). In section 3, we will explain the data and methods. Section 4 covers the measurement of the work pressure, in which publication pressure figures prominently. This is done by measuring the perceived pressure for four types of tasks: publishing, teaching, acquiring funding and administrative duties. Subsequently in section 5 we will estimate the consequences of the publish-or-perish principle on how economist perceive the circumstances under which

they work as well as the functioning of economics as a science. Section 6 concludes and will put the findings in perspective.

## **2. Publish-or-perish principle in context**

The publish-or-perish principle is not novel idea. The eminent science scholar Garfield (1996) pointed to the first printed usage of this term in the work of sociologist Wilson (1942) who wrote: “The prevailing pragmatism forced upon the academic group is that one must write something and get it into print. Situational imperatives dictate a ‘publish or perish’ credo within the ranks” (p. 197). He guessed that Wilson, being a student of the renowned sociologist of science Robert Merton, was expressing a feeling that must have been present among American faculty. For the ambitious scholars ‘publish-or-perish’ was initially seen as a sound principle. As Beard (1965) expressed it: “advancement and academic recognition shall depend in part upon one’s contribution to the published literature of his academic field.” It was seen as good and non-controversial step, although Beard was not blind to the downsides of this policy and how it can jeopardize academic obligations such as teaching. As he notes: “the road to institutional distinction is also strewn with tragedies, tragedies that have resulted when an institution's ambitions have far exceeded its resources.” (p. 458)

Within the early economics and sociology of science literature, stressing publication as an academic requirement also sound principle. Getting your work into print is closely aligned with the priority principle stressed by Merton (1973): the goal of scientists is to be the first to communicate an advance in science. Today this communication is done primarily in journals managed by scientists who consult their peers to review a contribution. A journal publication can hence be seen as the recognition awarded by the scientific community for being first. This ‘race to priority’ is very similar to what economists call patent races or winner-takes-all contests. Being first in claiming a discovery can be rewarded by citations or by means of eponymy or more formal prizes like the Nobel Prize. However, as Stephan (1996) remarks this economic focus neglects the idea that puzzle solving may be an equal important motivating force that explains why people participate in science and why winning races is not everyone’s goal in life. However, with the emergence of research universities it became necessary to pay close attention to the composition of staff that has a taste for advancing science and that is not only interested in

the satisfaction of solving puzzles. Universities had to create a work environment in which the forces of competition and selection play a major role. The tenure system, also known as up-or-out contracts (Kahn & Huberman, 1988) are nowadays a common element in most universities, although in European universities this system has remained up and the till the turn of the century a ‘foreign’ idea. Being able to publish articles that gain wide recognition by one’s peers is seen as a precondition of being awarded tenure. Publications and citations could support this decision making. Initially scholars and bibliometricians were quite optimistic that citations measured quality. For instance, Cole and Cole (1973) claim that “the data available indicate that straight citation counts are highly correlated with virtually every refined measure of quality.” And in economics, Stigler and Freidland (1979) make the explicit assumption that “The quality of a scholar’s work is properly related to the frequency of its citations by his colleagues.” (p.1).

However, when the metrics became the most common measuring rod in characterizing the pecking order in science, bibliometricians warned time and again: impact is not the same as quality (Hicks, Wouters, Waltman, De Rijcke, & Rafols, 2015; Martin & Irvine, 1983; Moed, 2006) and as Adler and Harzing (2009) state their concern about the current ranking systems used by universities: “[these] systems are dysfunctional and potentially cause more harm than good.” The optimism that surrounded the use of these indicators may have given economists the idea that selection is greatly improved by relying on metrics. Practice turns out that such decision are not so simple. This type of disappointment is also illustrated in the paper by Brogaard, Engelberg, and Van Wesep (2018) who produce evidence that the tenure system does not seem to bring the promise of selecting those scholars who continue producing groundbreaking research. As they formulate their conclusion: “It does not appear that academic economists respond to the greater professional and intellectual freedom that tenure should provide by sustaining earlier research effort or by taking chances that lead to more home run research.” Part of the answer why we see a decline after tenure is in a sense logical as undertaking path-breaking work is generally done in the very early stages of a career (Jones, 2010; Van Dalen, 1999), although as Weinberg and Galenson (2019) show this may differ in economics on the type of research, conceptual economists peaking far earlier than what they call experimental economists. An alternative explanation that Brogaard et al. do not consider is the possibility that the amount of work pressure increases over a career. The implicit assumption is that tenure is the moment in a career when the ‘trial period’ is over, one can tackle any idea one wants. The sample period

that Brogaard et al. consider is namely also a period in which the publish-or-perish culture has become more widespread and more intense. In short, the rat race in academia never stops and once you have obtained tenure - as, e.g., an associate professor - you have to keep on publishing, acquiring funds and teach in order to become a full professor, and when you are a full professor the implicit and sometimes explicit targets for funding keep on increasing and time for research that matters decreases over time.

The publish-or-perish culture also resounds in the work by Niles, Schimanski, McKiernan, and Alperin (2020) who show how young scholars at academic institutions in the US and Canada value the impact factor of journals, the number of publications and other metrics at a far higher rate than older and tenured scholars. For those scholars who are involved in review processes concerning promotion and tenure these factors are virtually the only ones that count but, as Niles et al. make clear, deep down they only care about their work being read by their colleagues who work in similar niches in their discipline. They interpret this as a disconnectedness among scientists: people who still have to strive for tenure or promotion have to believe in the value of impact factors and Hirsch-indexes because that is what counts and that is what reviewers of grant proposals will take on board in their evaluation. Contrary to the younger faculty, the older and tenured faculty care less about the conventional metrics and they choose topics and areas irrespective of whether this attracts a lot of citations and hence they disconnect from what they perceive their peers might value.

This divide noted by Niles et al. is intriguing. Not only may their research explain the findings by Brogaard et al. (2018) - why tenure does not seem to work as envisioned - it also suggests that one can benefit by taking a look at how actual scientists perceive their work conditions. The debate about the publish-or-perish principle is broader than simply monetary incentives and productivity. Most faculty members would agree that the publish-or-perish principle has benefits, such as the possibility to make the meritocratic principles do their work and give everyone the chance to move upward in the hierarchy and improved quality of research by peer review. However, the use of metrics as selection criterion as well as the strong increase in the number of competitors for a small number of positions in universities, grant opportunities of journal outlets has changed the face of science. Think of the excessive number of publications that are not cited and hardly read as a reflection of the competition for attention (Laband &



Tollison, 2003; Nicolaisen & Frandsen, 2019; Van Dalen & Henkens, 2004). In some ways this can still be seen as reflection of the Matthew Effect (Merton, 1968). But the lack of attention becomes different when your promotion or grant application depends on it, and it may change the choice of topics or a tendency to neglect national issues for scientists working in non-English countries (Van Dalen and Henkens (2012a), or more directly because it is not seen or ‘counted’ by university management as a scientific activity. The strong increase in number of scientists has led to an increasing number of people wanting to get published, leading to congestion in the publication process: finding suitable reviewers, long waiting times for articles being printed/published, the rise of fake and low quality journals (Altbach, 2013), and in the case of open access journals for which one has to pay a substantial fee<sup>2</sup> the urge and sometimes pressure felt by editors from publishers to accept and publish mediocre articles can be large (de Vrieze, 2018). But of course, the most worrisome side effect of publication pressure can be traced to the increase in scientific misconduct or unethical publication behavior like data manipulation, plagiarism or fraud (Fanelli, 2010; Fang, Steen, & Casadevall, 2012; Martin, 2013; Petersen, 2019; Seeber, Cattaneo, Meoli, & Malighetti, 2019).

The increased competition among scientists has also had its implication for funding of research as competition for grants has become more fierce and success rates are slim. Established researchers (Bollen, Carpenter, Lubchenco, & Scheffer, 2019; Bollen, Crandall, Junk, Ding, & Börner, 2017) see that the current system of funding research in general has become too bureaucratic and entails high costs on those who write grant proposal as well as the reviewers of those proposals. And from different sources this dissatisfaction seems to be well founded. In terms of time spent writing grant proposals, Gross and Bergstrom (2019) show that “the value of the science that researchers forgo while preparing proposals can approach or exceed the value of the science that the funding program supports.” (p. 1) Furthermore, the element of luck in obtaining a grant can be quite large as either agreement among reviewers on what is a good proposal can be quite low (see for US evidence Pier et al. (2018)) or because - as in the case of the Netherlands - review committees are multidisciplinary and members have no intimate knowledge of the proposals or of the field and indirectly publication records get a much larger weight in making assessments.

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<sup>2</sup> For instance, fees for publishing in PLOS journals vary in the range of 1,595 to 3,000 US dollars in 2019.

### 3. Method and data

To assess the impact of the publish-or-perish principle data were collected by means of a survey (in English), distributed among faculty members of all economic departments at Dutch universities. In line with privacy regulations, the survey was distributed by the deans of the separate economics departments among its faculty with a supporting email letter from the dean. The group of respondents did not only include tenured faculty, but also non-tenured personnel, like PhD students and tenure track assistant professors or research or teaching faculty with short-term contracts. The field work was carried out between November 2015 to January 2016 and the overall response was 453, giving a response rate of 24 percent (which is comparable to similar expert surveys, see (Klein & Stern, 2005; May, McGarvey, & Whaples, 2014; Ricketts & Shoesmith, 1992; Van Dalen & Henkens, 2012b)).<sup>3</sup> The survey contained a substantial number of questions shedding light on the different tasks that faculty perform within their universities as well as their opinion on the how performance is evaluated and perceived within their university and their perception of the pros and cons of using publication and citation metrics, or how personal values impact scientific practice (Van Dalen, 2019). These attitudes and opinion questions will be introduced later on, but at this point we want to introduce the variables which are important to see whether the position one has in academia might impact one's perception of the work pressure. For now it suffices to sum up the most salient characteristics (see Table 1) of our sample of economists. The average age in our sample is 40 years, 33 percent of the sample has a foreign nationality and 23 percent of this sample is female. The various positions that one can fulfill is varied but reflect adequately the various positions in Dutch academia. The average respondent has reported that he or she has published 1.8 articles in international refereed journals (with an impact factor of Web of Science) in the past year, which is more or less in line with the norm that some universities use to grant tenure.<sup>4</sup> Assistant professorships can cover fixed term contracts (tenure track) or permanent contracts. Associate and full professors are always tenured. Special endowed chairs at Dutch universities ('extraordinary professor') can be funded through external funds, i.e. private companies or foundations. These 'professors by special appointment'

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<sup>3</sup> Not every question was answered by respondents and for some analyses the 'don't know'-option was not included yielding different numbers of observations.

<sup>4</sup> For instance, the Erasmus School of Economics stipulates as one research criterium for promotion to associate professor an annual publication record of 1.5 peer-reviewed articles or papers in international peer-reviewed journals. See their [Criteria for appointment and promotion as of May 2016](#).

are often appointed on a fixed-term and part-time basis, and often have a full-time position in a firm, government agency or another university/research institute.

**Table 1: Descriptive statistics of explanatory variables**

	Mean	Standard deviation	Min	Max
Work pressure (10-point scale)				
Teaching courses	6.43	2.03	1	10
Publishing research	7.84	1.80	1	10
Acquiring research funds	6.22	2.55	1	10
Administrative duties	5.49	2.38	1	10
Publication record past year				
# International refereed articles	1.81	1.91	0	11
Age (years)	41.55	11.35	24	69
Gender (male = 0)	0.20	0.40	0	1
Nationality of birth (Dutch = 0)	0.34	0.47	0	1
Academic position				
PhD student	0.21	0.43	0	1
Temporary contract/post-doc	0.06	0.24	0	1
Assistant professor	0.28	0.45	0	1
Associate professor	0.18	0.38	0	1
Full professor	0.23	0.42	0	1
Extraordinary/emeritus professor	0.04	0.21	0	1
University of employment				
University of Amsterdam	0.13	0.34	0	1
Free University Amsterdam	0.13	0.33	0	1
Erasmus University	0.13	0.34	0	1
Tilburg University	0.15	0.35	0	1
University of Groningen	0.20	0.40	0	1
University of Maastricht	0.12	0.32	0	1
University of Utrecht	0.06	0.23	0	1
University (combination) <sup>a</sup>	0.09	0.29	0	1

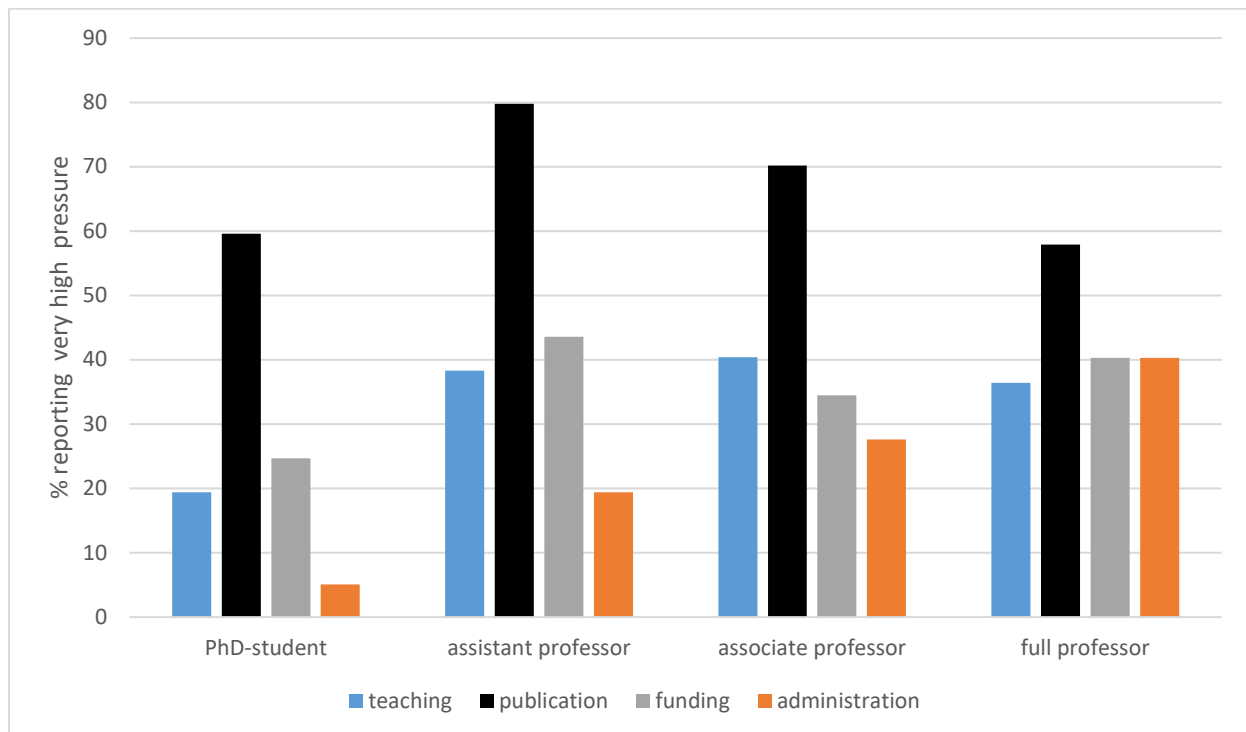
N = 319

(a) For matters of small numbers we have collapsed the responses from economists of the universities of Delft, Leiden and Nijmegen in one statistical group.

#### 4. Measuring and explaining the work pressure

The work pressure measurements are central in this paper and the statistics in Table 1 show unequivocally that of all the regular academic tasks the publication pressure is perceived to be the highest with a value of 7.8 on a 10-point scale (with 1= no pressure at all; to 10 = extremely high pressure). Publications are frequently used in national research assessments, rankings, internal allocation of funds across departments within universities and of course in internal assessments of functioning. The pressure to teach (6.4), acquiring research funds (6.2) and administrative duties (5.5) are substantially lower. The fact that on average these tasks generate less pressure than publication is plausible because certain ranks within the universities (e.g., PhDs in their start-up years) are not thoroughly involved with acquiring funds, teaching or administration.

**Figure 1: The perceived high work pressure in Dutch economics departments for a number of academic positions, 2015-2016**



Note: very high pressure is here defined as respondents reporting an 8 or higher on the 10-points scale of pressure in teaching, publication, acquiring funds, and administration.

Figure 1 brings across how the pressure mounts across career positions with economics. When we talk about the work pressure this pressure is felt not only by young researchers, but virtually by all academics who want to pursue a career in science. As one can detect in Figure 1, the publication pressure is highest among those who want to attain tenure or are set on becoming a full professor. What makes things complicated is that the pressures are jointly felt: a simple correlation matrix (see appendix, Table A1) shows that the pressure for all tasks are positively related. The fact that the pressure to publish and the pressure to acquire grants is well established (Waaiker, Teelken, Wouters, & van der Weijden, 2018) and perhaps self-evident nowadays because obtaining tenure depends having obtained grants and reviewers of grants (at the time of measurement) are always asked to look at the track record of applicants.<sup>5</sup> Teaching and administrative duties are often left out of the equation but is a task that is inherently tied to being an academic. Leaving out these elements is unfortunate, because in today's universities in Western countries mass education has become the rule in which faculty have to deal with rising student numbers. Hence, when the pressure goes up in, e.g., teaching, this is positively associated with a higher pressure in publication or in funding. An open question is whether the different groups in particular by position experience and report different levels of pressure. But, of course, to understand the context even better age, nationality, gender or the university where economists work are also of interest. Table 2 offers a set of equations (simultaneously estimated) that offer some insights as to who perceives the pressure to be high.

The publication pressure is perceived to be the highest among assistant and associate professors. This accords well with a study by Haven, Bouter, Smulders, and Tijdink (2019) who focus on different disciplines at four academic institutions in Amsterdam. These are indeed the crucial periods in a modern university career when tenure and promotion depend to a large extent on one's publication record. What is perhaps more noteworthy is that the actual publication productivity – as a proxy for publication skills - does not soften the pressure: whether you publish a lot or just one or two articles in internationally refereed journals the pressure does not subside.

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<sup>5</sup> Recently, the Dutch Science Foundation (NWO) has changed this practice and as of 2020 candidates for a grant have to write an 'academic narrative profile' – describing the narrative of their career – as well as up to ten key publications.

**Table 2: Explaining the pressure to publish, acquire funds, teach and administer (based on 1-10 scale)**

	Perceived pressure to			
	Publish	Acquire research funds	Teach	Perform administrative duties
Publication productivity	-0.07 (0.06)	0.05 (0.08)	0.01 (0.07)	0.06 (0.07)
Age	-0.02* (0.01)	-0.04** (0.02)	0.01 (0.01)	-0.01 (0.02)
Gender (male = 0)	0.41 (0.25)	0.19 (0.35)	0.40 (0.29)	0.37 (0.32)
Nationality (Dutch= 0)	0.38* (0.22)	0.60* (0.31)	-0.05 (0.26)	-0.23 (0.28)
Position (PhD student = 0)				
Temporary contract/post-doc	0.29 (0.44)	2.15*** (0.61)	0.46 (0.52)	-0.19 (0.55)
Assistant professor	1.42*** (0.30)	2.57*** (0.43)	1.18*** (0.36)	1.47*** (0.39)
Associate professor	1.37*** (0.30)	2.48*** (0.53)	1.17*** (0.45)	2.16*** (0.48)
Full professor	1.10*** (0.44)	3.59*** (0.62)	1.10** (0.52)	2.99*** (0.56)
Extraordinary/emerg. professor	0.69 (0.59)	3.42*** (0.83)	0.21 (0.69)	2.03*** (0.75)
University of employment (University of Amsterdam = 0)				
Free University Amsterdam	-0.54 (0.38)	0.60 (0.53)	-0.60 (0.44)	0.08 (0.48)
Erasmus University	-0.30 (0.38)	0.77** (0.54)	0.52 (0.45)	0.71 (0.48)
Tilburg University	0.07 (0.35)	1.50*** (0.50)	-0.18 (0.42)	0.63 (0.45)
University of Groningen	-0.81** (0.33)	0.93** (0.47)	0.04 (0.39)	0.26 (0.42)
University of Maastricht	-0.71** (0.37)	1.23** (0.52)	-0.30 (0.48)	0.85* (0.47)
University of Utrecht	-0.42 (0.47)	2.35*** (0.66)	0.11 (0.56)	1.54*** (0.60)
University (combination)	-1.65*** (0.41)	1.38** (0.57)	0.10 (0.48)	1.10** (0.52)
Constant	7.84*** (0.61)	4.28*** (0.86)	4.59*** (0.72)	3.27*** (0.78)
Adj. R <sup>2</sup>	0.19	0.18	0.11	0.25

N = 319, estimated by means of three stage simultaneous equation estimation. Standard errors are between brackets and significance levels are denoted by \* p < 0.1; \*\* p < 0.05; and \*\*\* p < 0.01.

The pressure increases until one has reached the position of full professor where it slightly decreases, which may be a selection effect as this group has attained the skills to publish their research more easily, but it could also be the release of pressure because the final hurdle in a career has been taken. However, although these coefficients differ, equality tests show that differences between coefficients are not statistically significant.<sup>6</sup> In other words, contrary to what one might expect the publication pressure is not higher among junior members (PhD students and assistant professors) compared to more senior faculty, like associate and full professors. The publication pressure obviously does not subside substantially once one becomes an insider in academia.

Other observations that deserve some attention is the extra pressure felt by foreign faculty members. This is felt not only in the pressure to publish but also in acquiring research funds. An obvious reason why foreign faculty experience this pressure is not easily found as statements made by foreign faculty are not so prominent, but it could well be that getting accustomed to a new culture may offer extra pressure, and compared to Dutch speaking academics they do not have the fallback option in taking on a position outside the university in case one does not attain tenure. An alternative explanation may be that foreign faculty may also be more oriented towards the international academic job market<sup>7</sup> in which they are well aware that attaining a job at a prestigious university requires publications in top journals. Some differences are also to be noted with respect to the university of employment. The pressure is more less the same at the universities in Amsterdam, Rotterdam, Tilburg and Utrecht. At the universities of Groningen and Maastricht it is somewhat lower compared to the University of Amsterdam, but the pressure is considerably lower at the small departments scattered around the county: 1.65 points. This category is a mix of (small) economics departments at Leiden, Delft and Nijmegen that are not independent units but part of larger whole. Perhaps because of their substantially smaller group size and the lack of visibility as an economics department, they enjoy perhaps more freedom

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<sup>6</sup> Equality tests based on model Table 2 show that Prob > chi2 between assistant and associate coefficients is 0.61; between assistant and full professor 0.56; and between associate and full professor 0.64.

<sup>7</sup> In part this may also be a result of the preferential tax treatment (Extra territorial costs, ETC) which in the past allowed scientists a tax reduction of 30% for the duration of 8 years. Nowadays this tax regime is from 2019 onwards more aligned with other European countries and one can get this preferential treatment for 5 years. Research for the government by Vankan et al. (2016) shows that 80 percent of recipients of this tax program have moved onwards to another country within 5 years.

from the publication pressure. But it could also be a result of the fact that in research evaluations their work is not held to the same standard as regular economics faculties.

Finally, with respect to gender we cannot detect any pressure differences across male and female academics, although in the Netherlands there are mounting complaints about the barriers that female academics experience in particular in economics. In our sample women report a higher publication pressure (8.3) than men (7.8), but this seems to be composition effect as there are more women in assistant professorship positions than men, and also far more female respondents of foreign nationality (52%) compared to male respondents (28%).

With respect to the tasks of teaching, administration and acquiring research funds one can see that the academic position is of crucial importance: compared to PhDs the funding pressure keeps on mounting as the positions become more senior. With respect to teaching, the pressure is more or less equal across the various professorship statuses. However, it is approximately 1.1 points higher than the pressure experienced by PhDs. With respect to the affiliation, it should be noted that teaching pressure is quite uniform, whereas the pressure to acquire grants and perform administrative duties is characterized by some differences. Compared to our benchmark university the pressure to acquire research grants is almost everywhere higher. There are some signs that the smaller sized universities (Utrecht and mixture of Delft, Leiden and Nijmegen) experience higher grant pressure, which is an effect that has also been noted by Murray et al. (2016) for the case of Canada. The smaller size is also reflected in a higher pressure to perform administrative duties.

## **5. The consequences of the publish-or-perish principle**

### *5.1 Are economists divided on the pros and cons of publish-or-perish?*

To gauge the effects of how the publish-or-perish principle affects academic life, we first want to discover how economists perceive the consequences of the pressure to publish in international refereed journals in general. In short, are they optimistic about the merits of this pressure or are they pessimistic? The impression is that economists perceive both the positive – upward mobility and improvement quality of research - and negative sides of publication pressure, to wit, turning



your back on national issues, excessive publication and unethical behavior. Agreement on all items varies between 63 and 71 percent. This suggestion of consensus could be a false impression as not every respondent weights each item equally. To explore this issue in more depth, a latent class analysis (LCA) is performed to test whether we can detect a divide into different groups among economists.<sup>8</sup>

**Table 3: The pros and cons of pressure to publish in peer-reviewed journals**

<b>The pressure to publish in peer-reviewed journals...</b>	<b>Fully disagree</b>	<b>Disagree</b>	<b>Neither agree, nor disagree</b>	<b>Agree</b>	<b>Fully agree</b>	<b>Total<sup>a</sup></b>
1. Improves upward mobility in academic life	2.8	12.7	16.4	46.3	21.8	100.0
2. Makes researchers turn their back on national issues	4.4	16.3	16.8	46.8	15.7	100.0
3. Leads to an excessive number of papers which are hardly read	2.7	15.8	12.8	35.3	33.4	100.0
4. Improves the quality of research as a result of peer review	5.7	16.5	14.3	46.8	16.8	100.0
5. Increases the probability of unethical behavior like fraud or data manipulation	3.6	12.9	22.7	44.5	16.3	100.0

(a) For matters of comparison the 'don't know' category has not been presented.

Table 4 shows that there are two clear types of economists: those quite skeptical of the publish-or-perish principle: the positive sides receive lower weights than the negative sides. This is quite different among the optimists or the true believers of the publish-or-perish principle: the positive sides are clearly perceived by this group, whereas the downsides are given short shrift.

<sup>8</sup> The LCA is based on the five items of Table 3 transformed to binary items (0 = (fully) disagree/neutral; 1 = (fully) agree). We first compared a one-class model with a two class model. Based on the AIC and BIC we preferred the two-class model over the one-class model, which suggests that the sample of economists consists of at least two subgroups. A three-class model was also used but the estimation process did not converge, which may be because of the small sample size and small set of items used to test this model.

**Table 4: Latent class marginal means for a two-class model of economists<sup>a</sup>**

<b>The pressure to publish in peer-reviewed journals...</b>	<b>Class 1: Skeptics of publish-or-perish principle</b>	<b>Class 2: Optimists of publish-or-perish principle</b>
1. Improves upward mobility in academic life	0.61 (0.03)	0.84 (0.05)
2. Makes researchers turn their back on national issues	0.78 (0.03)	0.27 (0.06)
3. Leads to an excessive number of papers which are hardly read	0.91 (0.04)	0.19 (0.07)
4. Improves the quality of research as a result of peer review	0.49 (0.04)	0.95 (0.04)
5. Increases the probability of unethical behavior like fraud or data manipulation	0.76 (0.03)	0.24 (0.07)
Latent class marginal probabilities	0.69	0.31
Akaike Information Criterion (AIC)	2200.23	
Bayes' Information Criterion (BIC)	2243.37	
N	373	

(a) LCA based on the five items of Table 3 transformed to binary items (0 = (fully) disagree/neutral; 1 = (fully) agree). Standard errors between brackets.

To see whether these two classes differ across a number of structural background factors of respondents, Table 5 offers a hierarchical logit analysis of the probability whether an economist is an optimist (with the skeptical economist as base category). The basic model (1) is extended in column (2) with the work pressure (publish, teach, acquire funds, and administration) to see whether work pressure is related to the fact that one is a skeptic or an optimist. Four aspects of Table 5 deserve some attention. First, whether one is a prolific academic or not, this does not appear to affect one's position on the publish-or-perish principle. To some extent this is surprising as one would think that prolific scholars are treated well by the system, whereas scholars who do not have "the itch to write" and have difficulty in getting their work published would have more misgivings.

**Table 5: Logit model explaining whether economists belong to the class of optimists (with skeptics as benchmark)**

	Probability being optimist about publish-or-perish	
	(1)	(2)
Publication productivity	0.04 (0.08)	0.03 (0.08)
Age (in years)	-0.02 (0.02)	-0.03 (0.02)
Gender (male = 0)	0.19 (0.35)	0.26 (0.36)
Nationality (Dutch= 0)	-0.06 (0.32)	-0.00 (0.33)
Position (PhD student = 0)		
Temporary contract/post-doc	0.54 (0.64)	0.72 (0.67)
Assistant professor	1.11** (0.46)	1.53*** (0.51)
Associate professor	0.91* (0.55)	1.34** (0.61)
Full professor	1.95*** (0.64)	2.41*** (0.72)
Extraordinary/emerg. Professor	-0.65 (1.18)	-0.30 (1.21)
University of employment (University of Amsterdam = 0)		
Free University Amsterdam	-0.82 (0.52)	-0.85 (0.53)
Erasmus University	0.12 (0.50)	0.12 (0.52)
Tilburg University	-0.17 (0.47)	-0.09 (0.49)
University of Groningen	-0.73 (0.50)	-0.80 (0.48)
University of Maastricht	-0.21 (0.50)	-0.23 (0.52)
University of Utrecht	-2.38** (1.10)	-2.30** (1.11)
University (combination) <sup>a</sup>	-1.38** (0.62)	-1.58** (0.67)
Pressure to:		
Publish	-	-0.13 (0.09)
Acquire funds	-	-0.05 (0.07)
Teach	-	-0.03 (0.08)
Administrative duties	-	-0.01 (0.07)
N	319	319
Pseudo R <sup>2</sup>	0.10	0.11

Standard errors are between brackets and significance levels are denoted by \* p < 0.1; \*\* p < 0.05; and \*\*\* p < 0.01.

Second, assistant, associate and full professors are shown to be more prone to being believers in the publish-or-perish system than other positions. The position of assistant professor is more in line with the findings of Niles et al. (2020). This is often a precarious position to move on up the academic ladder one has to believe that a system based on the publish-or-perish principle is by and large a good system. The fact that (tenured) associate and in particular full professors are found to be true believers of this system is in contradiction with the findings of Niles et al. (2020). Still, one can imagine why they may be leaning to being optimistic about the system: full professors are the faculty members who have attained tenure by fulfilling the requirements of the system and they are the living proof that the system works, at least for them personally.<sup>9</sup> However, one should note that despite the fact that they are more supportive of the principle of publish-or-perish than junior faculty, it does not mean that full professors as a group are supportive the publish-or-perish principle: the majority of full professors is skeptic (56%), but compared to all the other positions this percentage is relatively low (e.g., 75% of PhDs and 66% of assistant professors are far more skeptical).

A third finding to be noted from Table 5 is that most universities are very much alike. Only economists situated at the University of Utrecht and to a lesser extent at the small departments of Leiden, Nijmegen and Delft are far less likely to be optimists. A plausible reasons to explain the stance of Utrecht economists is the fact that the department strives to be multidisciplinary. For such faculty it may be hard to show to the outside world its true identity as the yard stick of ‘straight’ economics departments is not the yard stick with which this university desires to be measured.<sup>10</sup> Furthermore, as Leahey (2018) shows interdisciplinary research moves at a slower pace than monodisciplinary research and achieving recognition is not an easy feat.

And a fourth finding is that the perceived work pressure (see model 2) is not associated with being an optimist. The pressure across all four tasks is found to be more or less equal across the two classes. This is an important fact because being optimistic about the publish-or-perish

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<sup>9</sup> Detailed analysis of the individual items (see appendix, Table A3) shows full professors are far more adamant than assistant professors in supporting the publish-or-perish culture: they stress the positive aspects and firmly deny the possibility that the publication pressure increases the probability of unethical behavior. Assistant professor only stress the positive sides of the system.

<sup>10</sup> The same may also apply to the universities of Leiden and Nijmegen. The Leiden department is situated at the Leiden Law School and has a more practical orientation and Nijmegen School of Management has a pluralistic and practical approach in some ways similar to Utrecht.

principle is not directly related to lower work pressure. In other words, one's attitude towards the publish-or-perish principle seems to be genuine and not a case of 'sour grapes' in terms of skeptics having a higher work pressure and optimists a lower work pressure.

## 5.2 *The effects on the work environment and science as institution*

The previous results show that economists see both the pros and the cons tied to stressing publication in internationally refereed journals. But how do economists perceive the effects of publication pressure on their work environment and how science as an institution functions? And how strong are the differences between the skeptics and the optimists among the economists?

Table 6 gives a general overview of the opinions of economists. If we restrict our attention to the most strongly held opinions it is clear that academics feel disconnected with what their employer desires. Most economists (62%) have become quite cynical as they perceive that 'their' university does not care what they publish, only how much and in which journals, preferably the much prized top journals, like *American Economic Review*, *Econometrica*, *Journal of Finance* and other high impact journals. High impact journal articles further, of course, the prestige of universities. But another reason why a divide among faculty seems to form is the fact that publications in Dutch language journals are not recognized by their organization as a scientific contribution (75% perceive this to be the case). In line with national initiatives to promote the 'valorization' of science, Dutch publications are seen as a form of applied science and they generally do not count as scientific contributions in research assessments of individuals or universities. This double message may be a reason for cynicism among the faculty that does make an effort to write for a broader audience. A clear consequence of the publication pressure can be seen in the fourth statement where 33 percent of the faculty has thought of leaving academia, and just a small majority (52%) disagrees with this statement.

When we turn to the way science functions in Table 6, most economists are strong believers in the benefits of the peer review system (59%). On the other hand, most economists (59%) are quite dissatisfied with the allocation funds in the Netherlands as they do not see that public funds flow to the most original researchers. Other statements do not generate a clear consensus, but this fact may also be telling. One would, for instance, expect a firm agreement on

one of the Mertonian norms in science, viz. the way knowledge is created and published is transparent (Merton, 1973). Instead merely 37 percent agrees and 29 percent disagrees.

**Table 6: Satisfaction or dissatisfaction with the publish-or-perish culture in academia**

Statements:	Fully disagree	disagree	Neither agree, nor disagree	Agree	Fully agree	Total <sup>a</sup>
<i>Work environment university</i>						
1. My organization does not care what I publish, only how much and in which journals	6.7	17.6	13.7	34.3	27.9	100.0
2. Publishing in Dutch is not recognized by my organization as a scientific contribution	2.8	11.0	11.7	39.6	35.0	100.0
3. Being cited or respected by other scholars is what motivates me most in my work	7.8	28.6	26.2	30.5	7.0	100.0
4. Universities are embracing the norms and values of firms	5.2	31.9	28.6	27.7	6.7	100.0
5. Because of the publication pressure I have thought about leaving academia	21.8	29.7	15.5	21.0	12.0	100.0
<i>How science works</i>						
6. The knowledge produced by economists is contested and corrected by their peers	3.6	12.2	25.5	53.1	5.6	100.0
7. Current generation of economists in (Dutch) universities will bring forth a future Nobel Prize winner	18.1	47.3	26.7	6.5	1.4	100.0
8. Public funds for scientific research flow to the most original researchers	14.8	44.2	22.7	16.6	1.7	100.0
9. Economists are too much a slave of fashions in economic theory and policy	5.4	18.6	27.1	36.9	12.0	100.0
10. The way economic knowledge is created and published is transparent	8.0	21.1	33.8	35.3	1.8	100.0

(a) For matters of comparison the 'don't know' category has not been presented.

But how do the two classes of economists – the optimists and the skeptics - perceive the way science functions? Table 7 gives the levels of agreement and disagreement and across each and every statement the two classes differ or are complete opposites at conventional levels of

significance (5% or less). To give an example of opposite positions, skeptics are not strongly motivated (41%) by citations or respect of other scholars, whereas optimists are in large part (48%) motivated by these forms of recognition. Clear differences in work practice are to be noticed in the degree how universities are perceived as appreciating the content of the work of respondents: 70 percent of the skeptics agree that universities don't care about the content, whereas optimists leave more doubt: 44 percent agrees with this statement.

**Table 7: Different perceptions about work environment and science across two latent classes of economists**

Statements:	Class 1: Skeptics		Class 2: Optimists		N
	% disagree	% agree	% disagree	% agree	
<i>Work environment university</i>					
1. My organization does not care what I publish, only how much and in which journals.	19.4	70.4	34.8	43.8	359
2. Publishing in Dutch is not recognized by my organization as a scientific contribution	13.3	76.0	14.9	71.3	326
3. Being cited or respected by other scholars is what motivates me most in my work	41.4	32.8	25.2	47.8	371
4. Universities are embracing the norms and values of firms	33.6	40.2	45.0	21.0	329
5. Because of the publication pressure I have thought about leaving academia	44.7	40.3	66.7	16.7	367
<i>How science works</i>					
6. The knowledge produced by economists is contested and corrected by their peers	20.9	53.1	3.6	72.4	337
7. Current generation of economists in (Dutch) universities will bring forth a future Nobel Prize winner	71.1	6.7	51.8	10.8	277
8. Public funds for scientific research flow to the most original researchers	65.7	14.9	43.1	26.5	344
9. Economists are too much a slave of fashions in economic theory and policy	13.8	62.5	46.4	19.1	350
10. The way economic knowledge is created and published is transparent	36.6	25.2	11.1	65.7	337

(a) For matters of comparison the 'don't know' category has not been presented.

When we turn to the way science is perceived to function, the skeptics are quite convinced (63%) that economists are too much a slave of fashions in economic theory and policy (Sunstein, 2000). Optimists are of the opposite opinion as 46 percent disagrees with this statement. A similar divide can be noticed in the way economic knowledge is produced and published: 37 percent of the skeptics disagrees that this process is transparent, whereas the optimists are very convinced (66%) that this is the case.

With these strong divergent opinions between skeptics and optimists, it may come as no surprise that skeptics show a far stronger inclination to exit academia: 40 percent has thought about leaving academia, against 17 percent of the optimists. To discover in more detail whether there are signs that predict the occurrence of these thoughts we also carried out an ordered logit analysis on the individual items (appendix Table A4). The most striking element of this analysis is that no structural characteristic seems to matter. This suggests that thinking about leaving is not tied to any position and this is to some extent remarkable. For instance, one would have expected a strong effect for those economists working in junior positions because this is a stage in a career where people may have doubts about staying on in science. The only characteristic that is of some importance is the publication productivity: if you are a prolific writer these thoughts do not arise, at least not as strong as they do for those who have a weak publication profile. Besides of course, being skeptical about the publish-or-perish principle, this is a plausible outcome as academic life whether you are a PhD-student or a full professor is not satisfactory life when you publish very little and assessment exercises that are regularly held make this public.

## **6. Conclusions and discussion**

The economist and Nobel laureate Paul Samuelson (1962) once summarized what intrinsically motivates scientists: “In the long run, the economic scholar only works for the only coin worth having – our own applause.” This idealized version of how science works and the underlying motivations of scholars can be traced in the early literature on the economics of science (Stephan, 1996). The race to solving the great puzzles of a science as well as gaining recognition by one’s peers was highly prized, money or employment was of secondary importance or at most a spinoff. However, with the increasing importance of bibliometrics in driving rewards,



promotion and tenure in everyday university life (Stephan, 2012) “the applause” of peers has become instrumental in securing lifetime income and employment. To act in accordance with these metrics has become a dominant strategy for academics (Casadevall & Fang, 2014). Competition for funding, prestige and positions within academia are so strong (Anderson, Ronning, De Vries, & Martinson, 2007) that the pressure to publish is always present. In the process of writing grant proposals it has become more or less standard and sometimes mandatory to include the impact factor of the published articles to inform and persuade reviewers.

The current paper has focused on whether this instrumental use of indicators of science – summarized in this paper as a publish-or-perish principle - has left its mark on how academic economists perceive their work environment and the scientific integrity of their discipline. First of all, the pressure to publish is considered high by the majority of faculty. And contrary to common wisdom – that this pressure only affects the young and precarious like PhDs and post-docs - this study shows that in particular the senior staff experiences high pressure and significantly more so than PhD students. This pressure also colors one’s outlook on the academic environment. Although most academics agree that the pressure to publish in international refereed journals has its intended merits it also it is also perceived to have clear unintended negative consequences. Among economists we discover a clear divide between the skeptics and the true believers of the publish-or-perish principle, with the skeptics representing a clear majority of the faculty. In particular, the perception of skeptics that their employer – the university – only cares about how much one publishes and in which journal and not about the content of their publication is a tell-tale sign of disconnectedness.<sup>11</sup> Finally, the prospect of leaving academia is to a large degree inspired by the dissatisfaction with publish-or-perish principle as well as one’s ability to publish. These thoughts of leaving academia are not just felt by PhDs or assistant professors – stages in an academic career where these doubts and feelings are normal - but at every rank in academia.

These findings have, of course, their limitations as the data are restricted to a cross-section of economists working in Dutch universities and the statistical analysis naturally cannot

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<sup>11</sup> The fact that journal publications in Dutch are not counted and seen as a scientific contribution is to some extent understandable as these journals do not have the same standards of peer reviews and large audiences that English or American journals have, but it apparently is an element of considerable frustration; a frustration that is expected to be shared by economists of ‘small’ countries that also have to make their research known to two audiences if they want to remain relevant to those two ‘masters’: an English and a local (non-English speaking) audience.

cover issues of causality or trace how careers and attitudes develop over time. Still, the attitudes and opinions stated by these economists cannot be easily dismissed and some findings may trigger further research. When most academics are skeptical if not outright negative about the publish-or-perish principle why are changes then not enacted? Straightforward answers are unfortunately not available. The main difficulty with metrics is that “the genie is out of the bottle” and putting it back inside the bottle is fraught with pitfalls as the ‘good old days’ may, first of all, represent an idealized version of science. Second, the university of the past has been superseded by a completely different academic environment. The modern-day university is functioning in a highly competitive and globalized labor market and a market for ideas which has become highly specialized and fragmented. Furthermore, the university is geared to and depends on mass education. In this environment, tackling management problems with metrics or ‘critical performance indicators’ seems logical to managers, but can backfire as the current study and many others suggest. For instance, ambitious deans or managers may be tempted to promote mission statements that are unrealistic (“we will belong to the global top-10 of research universities”) placing employees in positions to resort to unethical means in order to attain that status. Resolving ethical dilemmas is not easily achieved (Zhang, Gino, & Bazerman, 2014), but it may start with getting away from the ranking games at individual and institutional levels (Adler & Harzing, 2009; Biagioli & Csiszar, 2020; Osterloh & Frey, 2015). And resolving the ‘funding or famine’-stress may perhaps start to seeking less bureaucratic procedures and exploiting the wisdom of the scientific crowd (see Bollen et al. (2017)).

On a more general level, the unintended consequences can be detrimental to the way social science like economics is practiced. Economics is both a science and an art and it takes all sorts of scholars to solve grand puzzles and transfer knowledge. Excessive focus on science indicators may lead management to overvalue certain type of scientists and undervalue other types. The making and education of economists may lead to a monoculture in which the Academic Professional dominates and has lost touch with the Political Economist (Colander, 2011). The different tasks of an academic economist encompass so many dimensions that are not easily measured or weighted, and common metrics as a management tool may only give non-specialists the illusion that they have taken an informed decision. Misrecognition of qualities is a serious impediment to economics as a science. For instance, in case of institutions concerning promotion and tenure are heavily influenced by tenured scientists who display homophily – they

favor tenure candidates who adhere to their paradigm – sciences lacking experimental evidence can become dominated by people adhering to what Akerlof and Michailat (2018) call false paradigms. It is a matter of judgement whether economics can be described as this type of science, but scholars like Fourcade et al. (2015) and Colander (2015) have noted that economics has all the traits of being trapped in the bubble of an elite set of universities. Furthermore, institutions and social norms within a science may push scientists in roles that do not match their qualities or take advantage of their comparative advantages. The critique of Akerlof (2020) is in that respect relevant. He points out that the current institutions of publication and promotion offer biased incentives that lead to what he calls ‘the sins of omission’: economics as discipline tends to ignore important topics and problems that are difficult to measure in a ‘hard’ way. Qualitative research is, for instance, more difficult to publish than quantitative research. And scholars who like to benefit from the insights generated in other disciplines and offer interdisciplinary insights often take the slower route as it is harder to appreciate their contributions as Leahey, Beckman, and Stanko (2017) show.

In short, a real appreciation of scholars cannot be summarized looking up one’s H-index or field weighted impact factor in the Web of Science, Google Scholar, Scopus or any other citation database. To return to the advice of Samuelson which he gave by expressing that implicit incentives - applause is our only coin worth having - are at the heart of practicing economic science. A real appreciation of a scholarly achievement starts with having intimate knowledge of the field and a patience to see ideas tested and tried.<sup>12</sup> And in designing ‘incentive’ structures in science perhaps there is only one good advice: be aware that scientific knowledge is not a private good and science is not a market. The interests of science are likely to be best served by appealing to the intrinsic motivation of scientists. Or to cite the lesson pointed out by Arrow (1987) when he was discussing the priority system in science: “Society is more ingenious than the market.” (p.687)

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<sup>12</sup> In a forgotten footnote to this much cited quote he adds that: “This is not a plea for ‘Art for its own sake’ [...]. It is a plea for calling shots as they really appear to be (after reflection and after weighing all evidence), even when this means losing popularity with the great audience of men and running against ‘the spirit of the times’.” (p. 18)

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## Appendix:

**Table A1: Pairwise correlations between academic tasks**

	Teaching	Publication	Funding	Administration
Teaching	1.00			
Publication	0.30***	1.00		
Funding	0.30***	0.39***	1.00	
Administration	0.44***	0.19***	0.48***	1.00

Significance levels are denoted by \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; and \*\*\*  $p < 0.01$

**Table A2: Differences in pressure across latent classes among economists**

Perceived pressure (1-10) to:	Class 1: Skeptics		Class 2: Optimists		t-test
	grade	s.e.	grade	s.e.	
Publish	7.87	0.13	7.76	0.17	0.52
Acquire research funds	6.25	0.18	6.16	0.22	0.29
Teaching classes	6.44	0.14	6.39	0.19	0.24
Administrative duties	5.45	0.16	5.57	0.24	0.41

N = 319

**Table A3: Understanding the perceived consequences of pressure to publish in peer-reviewed journals**

Theses:	Upward mobility	Turn back on national issues	Excessive number papers	Improves quality research	Increases unethical behavior
Publication productivity	-0.08 (0.07)	-0.02 (0.06)	-0.08 (0.06)	0.03 (0.06)	-0.05 (0.07)
Age	-0.02 (0.01)	-0.01 (0.01)	0.04 (0.01)	-0.01 (0.01)	0.02 (0.01)
Gender (male = 0)	0.36 (0.29)	-0.31 (0.28)	-0.08 (0.27)	-0.36 (0.27)	0.43 (0.28)
Nationality (Dutch= 0)	0.39 (0.24)	-0.59** (0.24)	-0.14 (0.24)	0.54** (0.23)	-0.38 (0.24)
Position (PhD = 0)					
Temporary/post-doc	0.18 (0.43)	-0.31 (0.42)	-0.33 (0.44)	0.23 (0.42)	-0.44 (0.45)
Assistant professor	0.97*** (0.34)	0.21 (0.33)	-0.54* (0.33)	0.73** (0.33)	-0.23 (0.34)
Associate professor	0.82* (0.42)	0.03 (0.41)	-0.47 (0.42)	0.71* (0.43)	-0.59 (0.43)
Full professor	1.85*** (0.49)	-0.21 (0.47)	-1.32*** (0.48)	1.42*** (0.49)	-0.99** (0.50)
Extraordinary professor	1.30** (0.62)	0.63 (0.61)	-0.67 (0.61)	1.21* (0.64)	-0.33 (0.66)
Other controls	Yes	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.03	0.02	0.03	0.03	0.02
N	335	344	349	351	338

In analyzing these items, we have left out the ‘don’t know’ category. All equations are analyzed by means of ordered logit analysis, cut-off thresholds are not presented. The other controls concern the university where respondents are employed. Standard errors are between brackets and significance levels are denoted by \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; and \*\*\*  $p < 0.01$

**Table A4: Explaining opinions on work environment and science of economists**

	#1 No care for content	#2 Dutch not science	#3 Citation as motivation	#4 University with values of a firm	#5 Leaving academia	#6 Knowledge corrected by peers	#7 Future Nobel potential	#8 Funding original research	#9 Economists prone to fashions	#10 Transparent knowledge production
Publication productivity	-0.08 (0.06)	-0.09 (0.06)	0.04 (0.06)	0.03 (0.06)	-0.22*** (0.07)	0.03 (0.07)	-0.08 (0.06)	-0.09 (0.06)	-0.05 (0.06)	0.09* (0.06)
Age	0.01 (0.01)	0.00 (0.01)	-0.02* (0.01)	0.01 (0.01)	-0.02 (0.01)	0.04 (0.01)	0.01 (0.01)	-0.01 (0.01)	0.05*** (0.01)	-0.05*** (0.01)
Gender (male = 0)	-0.04 (0.27)	0.27 (0.30)	-0.53** (0.26)	-0.08 (0.30)	0.17 (0.27)	-0.31 (0.29)	-0.04 (0.27)	-0.34 (0.28)	0.11 (0.28)	-0.96*** (0.28)
Nationality (Dutch= 0)	-0.41* (0.24)	-0.65** (0.26)	0.73*** (0.23)	0.26 (0.25)	-0.21 (0.23)	0.12 (0.26)	-0.41* (0.24)	0.00 (0.25)	0.45* (0.24)	0.41 (0.25)
Position (PhD = 0)										
Temporary/post-doc	0.81* (0.44)	0.11 (0.44)	0.00 (0.43)	-1.11** (0.46)	0.35 (0.43)	-0.43 (0.48)	0.81* (0.44)	0.16 (0.43)	0.15 (0.42)	0.53 (0.44)
Assistant professor	0.54 (0.33)	1.57*** (0.37)	0.47 (0.32)	0.01 (0.35)	0.28 (0.32)	-0.27 (0.33)	0.54 (0.33)	-0.15 (0.34)	-0.56* (0.33)	0.68** (0.33)
Associate professor	1.18*** (0.42)	1.41*** (0.45)	0.42 (0.39)	-0.65 (0.43)	-0.00 (0.40)	-0.77** (0.38)	1.18*** (0.42)	-0.97** (0.42)	-0.67 (0.41)	0.51 (0.43)
Full professor	0.14 (0.48)	1.17** (0.51)	1.40*** (0.46)	-0.55 (0.50)	-0.50 (0.46)	-0.34 (0.38)	-0.14 (0.48)	-0.18 (0.48)	-1.35*** (0.49)	1.95*** (0.49)
Extraordinary prof.	0.28 (0.62)	0.88 (0.61)	1.11* (0.58)	-1.01* (0.56)	-0.07 (0.60)	-0.71 (0.52)	0.28 (0.45)	-0.57 (0.62)	-0.53 (0.59)	0.44*** (0.60)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	0.03	0.07	0.03	0.02	0.05	0.02	0.03	0.03	0.03	0.06
N	341	308	353	311	349	322	341	326	331	322

In analyzing these items, we have left out the ‘don’t know’ category. All equations are analyzed by means of ordered logit analysis. The other controls concern the university where respondents are employed. Standard errors are between brackets and significance levels are denoted by \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; and \*\*\*  $p < 0.01$ .